

CLAIMS:

1. In a cellular radio system that transmits data from an IP-based network, through a base station controller (BSC) and any Base Station Transceiver (BTS) controlled by the BSC, to a plurality of active subscriber units, which are in radio communication with the BTS and in a data connection state, the data transmission from the BTS to any active subscriber unit at any time being at one of a plurality of given transmission rates and at a defined power level, relative to a maximum total power transmittable by the corresponding BTS; the power level is associated with said transmission rate and is a product of a specific power and a multiplier, the specific power being the power level of transmission to the subscriber unit at a given fundamental data rate and said multiplier having a fixed direct relation to the associated transmission rate –
a method for estimating the specific power of transmission from the BTS to each of the active subscriber units at any given time, the method comprising:
 - 15 (i) defining in time a succession of observation windows;
 - (ii) observing the data flowing into the BSC and addressed to each of the active subscribers and, for each subscriber, measuring the amount of such data flowing during each of a plurality of said observation windows, obtaining measured amounts; and
 - 20 (iii) calculating from said measured amounts an estimated specific power for each of the subscribers.
2. The method of claim 1, wherein the duration of each observation window is an integral multiple of allocation time slots.
3. The method of claim 1, wherein said plurality of windows is N windows, where N is equal to the number of active subscriber units.
- 25 4. The method of claim 3, wherein said calculating includes solving N simultaneous equations.

5. The method of claim 4, wherein the N equations are linear equations having N unknowns and NxN coefficients, the unknowns being proportional to specific power values of respective subscriber units and the coefficients being proportional to corresponding results from said measuring.
- 5 6. The method of claim 3, wherein said N windows form a first group of consecutive observation windows and further comprising repeating operations (b) and (c) for a second group of N observation windows, whereby some of the windows in the second group are identical with windows in the first group, then similarly repeating operations (b) and (c) for a third group of N observation windows with respect to the second group, and so on indefinitely.
- 10 7. The method of claim 6, wherein all windows of each pair of successive groups are identical except for the leading window of the first group of the pair and the trailing window of the second group of the pair.
8. The method of claim 1, further serving to schedule the transmission of data from the BTS to the active subscribers and further comprising:
 - 15 (iv) using said estimated specific power of all the subscriber units to schedule data transmission to the subscribers
9. The method of claim 1, further serving to control data flow into the BSC and further comprising:
 - 20 (v) using the results of said estimation to control the flow into the BSC of data addressed to the active subscriber units.
10. An apparatus connectable to a data ingress port of a base station controller (BSC) of a cellular radio system that transmits data from an IP-based network, through the BSC and any Base Station Transceiver (BTS) controlled by the BSC, to
25 a plurality of active subscriber units, which are in radio communication with the BTS and in a data connection state, the data transmission from the BTS to any active subscriber unit at any time being at one of a plurality of given transmission rates and at a defined power level, relative to a maximum total power transmittable

by the corresponding BTS; the power level is associated with said transmission rate and is a product of a specific power and a multiplier, the specific power being the power level of transmission to the subscriber unit at a given fundamental data rate and said multiplier having a fixed direct relation to the associated transmission rate

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said apparatus serving to control the transmission of data from the BTS to the active subscriber units and comprising a power estimator, operative — to define in time a succession of observation windows; to observe the data flowing into the BSC and addressed to each of the subscribers 10 and, for each subscriber, to measure the amount of such data flowing during each of a plurality of said observation windows; and to calculate, from any results of said measuring, an estimated specific power for each of the subscriber units.

11. The apparatus of claim 10, further comprising a scheduler, responsive to 15 said estimated specific power values and operative to schedule data transmission from the BTS to the active subscriber units.

12. The apparatus of claim 10, wherein the scheduler is further operative to calculate from said estimated specific power values predicted power values.

13. The apparatus of claim 10, further comprising a data flow controller, 20 responsive to said scheduling and operative to control the flow into the BSC of data addressed to the active subscriber units.

14. A cellular radio system, including at least one base station controller (BSC) and at least one Base Station Transceiver (BTS), controlled by any of the BSCs, and

25 operative to transmit data from an IP-based network, through any BSC and any BTS controlled by it, to a plurality of active subscriber units, which are in radio communication with the BTS and in a data connection state, the data transmission from the BTS to any active subscriber unit at any time being at one of a plurality of given transmission rates and at a defined power level, relative to a maximum total

power transmittable by the corresponding BTS; the power level is associated with said transmission rate and is a product of a specific power and a multiplier, the specific power being the power level of transmission to the subscriber unit at a given fundamental data rate and said multiplier having a fixed direct relation to the

5 associated transmission rate –

the system comprises a power estimator, having access to data flowing into the BSC and operative –

to define in time a succession of observation windows;

to observe the data flowing into the BSC and addressed to each of the subscribers

10 and, for each subscriber, to measure the amount of such data flowing during each of a plurality of said observation windows;

and to calculate, from the results of said measuring, an estimated specific power for each of the subscribers.